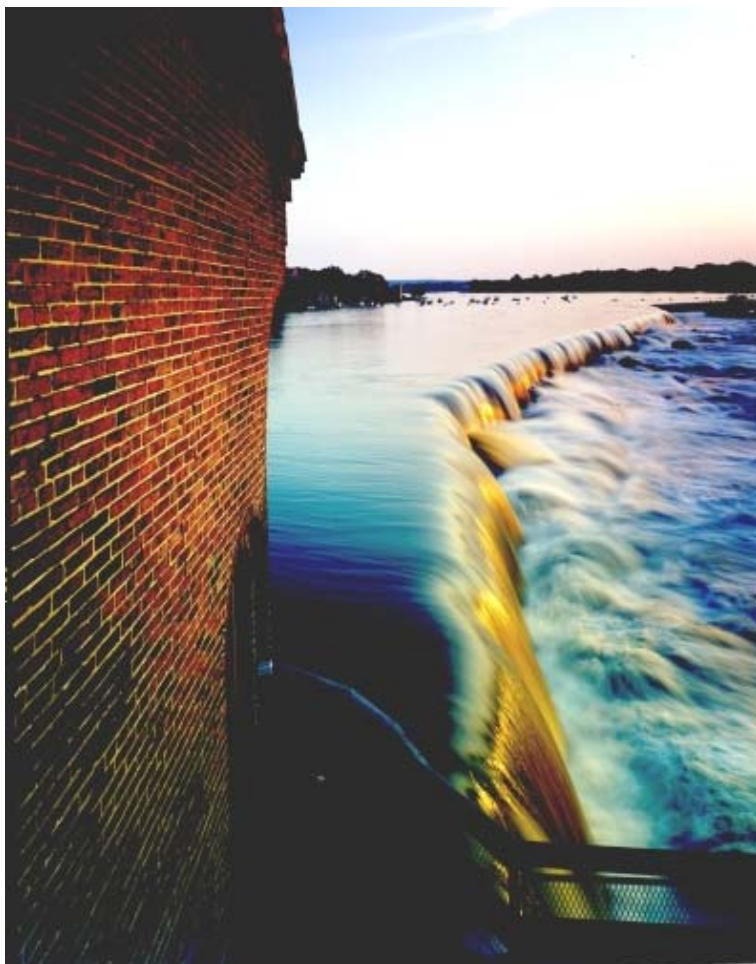


Land Use in Lowell: Mapping Industrial Change

National Park Service
U.S. Department of the Interior

Lowell National Historical Park



This lesson uses a mapping exercise to examine the physical and geographic changes that took place as the small rural community of East Chelmsford was transformed into the industrial city of Lowell. The class creates a narrative of change and thinks critically about what maps can tell us about how communities change over time.

This curriculum-based lesson plan is one of a thematic set on the Nineteenth Century using lessons from other Massachusetts National Parks. Also are:

[Boston Harbor Islands National Recreation Area](#)

The Fate of Liberty: The Role of Fort Warren in the Civil War

[Springfield Armory National Historic Site](#)

Springfield Armory: Technology in Transition

[The John H. Chafee Blackstone River Valley National Heritage Corridor](#)

Blackstone: A Case Study in Immigration

Included in this lesson are several pages of supporting material. To help identify these pages the following icons may be used:



To indicate a Primary Source page



To indicate a Secondary Source page



To Indicate a Student handout



To indicate a Teacher resource

Lesson Document

Link on the page to the document



Enduring Understanding
Industrialization changed where people lived, how they worked, and how they used the land.

Essential Question
How did land use in Lowell change as the area underwent its transformation from rural community to industrial city?

[Lowell National Historical Park](#) commemorates America's Industrial Revolution. As the first large-scale planned industrial city, Lowell provides a case study of the changes that accompany industrial growth, including changes in how and where people live and work and how they use land and water resources.

This lesson uses a mapping exercise to examine the physical and geographic changes that took place in the Merrimack River valley, where the small rural community of East Chelmsford was transformed into the industrial city of Lowell over the course of a couple of decades. Through group discussion, the class creates a narrative of change and thinks critically about what maps can tell us about how communities change over time.

Content Objective/Outcomes	Language Objective/Outcomes
<p>The students will:</p> <ul style="list-style-type: none"> Examine historical maps of the Lowell area to determine physical features necessary for industrialization. Describe some positive and some negative impacts of the way land and water was used for large-scale textile manufacturing in places like Lowell. 	<p>The students will:</p> <ul style="list-style-type: none"> Read and use a map key to identify common graphic features of maps. Integrate relevant information from group discussion for reports. Use clear topic development, logical organization, effective detail, and variety in sentence structure to write a multi-paragraph composition.

Number of Days: 2

Intended Grade/Range: 8-12

Resources/Materials

Website: Lowell National Historical Park at www.nps.gov/lowe (general park information) and at <http://www.nps.gov/lowe/photosmultimedia/prologue.htm> (background history of Lowell and related industrialization themes)
 Tsongas Industrial History Center at www.uml.edu/tsongas/index2.htm (information about curriculum-based education programs in the park)

Maps: 1821 and 1845 maps of Lowell, and 3 reference keys, from the collection of the Lowell Historical Society

Other: Colored pencils

Non-fiction: Lowell National Historical Park Handbook (*Lowell: The Story of an Industrial City*): pp. 15-25, 30-39 (“Seeds of Industry,” “City on the Merrimack”) 42-43 (“Lowell’s Canal System 1850”) 44-47 (“Waterpower”) *Cobblestone* (The Mill Girls) “Lowell Begins,” pp. 3-4.

Knowledge Required

To complete this lesson successfully, students need to know the following:

- How early industrial work systems and labor patterns differed from agrarian work systems.
- How canals were used for both transportation and power.

Students can find background information at the Lowell National Historical Park website listed in this lesson plan.

Teaching/Learning Sequence**Launch:**

Discuss the following questions with your class.

- What can maps tell us about the communities in which we live?
- If you saw a map of your community when it first became a city or town, how would it look different from a current map? Think about the number and location of roads, homes, businesses, public buildings, and farms, and the amount of open land. What might stay the same over time?
- Explain that students will be studying two 19th-century maps of Lowell to see what they reveal about the growth of the city as it underwent the transformation from an *agricultural* to an *industrialized* textile manufacturing area.

Vocabulary

Agricultural: Relating to an area where the land is used primarily for farming, orchards, grazing, and similar uses.

Industrialized: Relating to an area where the land is used primarily for factories, related establishments such as machine shops and warehouses, and worker housing.

Exploration: Lesson Document

Divide the class into small groups. Give each group a set of five Map Plates that provide clues about the changes in land and water use in the Lowell area during the first half of the 19th century.

- Plate 1 – 1821 Explanation
- Plate 2 – 1821 Reference
- Plate 3 – 1821 Map
- Plate 4 – 1856 Reference and Transcription
- Plate 5 – 1845 Map

Lesson Document

Give each group the *Directions for Students* handout. Allow 20-30 minutes for the groups to work with the maps and reference keys.

SUMMARY:

Use the discussion questions below to analyze the maps, and then summarize what students have learned from examining the maps and map keys. Emphasize that these changes occurred over a period of years. Use the student answers to create an outline for a “narrative of change” for this area. Point out that the maps tell us certain things, but not *everything* about the changes that occurred.

Farm Use

- Why were certain areas better suited for farming than others?
- What evidence from the maps tells you why the Pawtucket Canal was needed and why it was located where it was?

Changing Land Uses

- Compare the uses of land in Lowell in 1821 to the land uses in 1845. Capture as many similarities and differences as you can. What does this evidence tell you about how people were making their living in the two different time periods?

Choosing Textile Mill Locations

- What evidence from the maps tells you why the mills were located where they were?

ASSESSMENT:

Ask students to write a multi-paragraph composition about the effects of industrialization on life, work, and land/water use in the Lowell area in the first half of the 1800s. Ask students to use the outline from the Summary activity above to formulate well-organized paragraphs using supporting details and variety in sentence structure. When the paragraphs have been completed, ask students to create a question that they would like to ask about this period of Lowell history that the maps do *not* dress. For example, they might ask, “What happened to the Cheever, Fletcher, and Tyler families between 1821 and 1845, and how could we find out?”



The Power of Place

Site Visit:

Have you ever stood on the spot where some historical event occurred and felt a sense of awe and inspiration? This is the power of place you can experience when you visit a National Park. These historic places provide us with opportunities to connect with the lives of the generations before us. The power of place is that it gives history immediacy and relevance. As historian David McCullough*states, "When you stand there, in that very real, authentic place, you feel the presence of that other time, that *history* in a way that would be impossible did it not exist."

Visit Lowell National Historical Park to bring the ideas and the information in this lesson to life. While in the park, compare what students have explored on historical maps with what they notice about current land use. Bring the maps along, and at various points during your visit ask students to figure out which farm they would have been standing on in the pre-industrial period. Ask students to imagine the sounds and sights of this area when it was farmland. How has the area changed? What has stayed the same? By comparing and contrasting the area's rural beginnings to what they see today, students can draw further conclusions about how the growth of industry changed life, work, and land use.

In Lowell, students can walk among the historic textile mill complexes and housing areas and along the canals that powered Lowell's industrial growth. They can explore the actual main streets marked on the historic maps to determine present-day land uses. By traveling a short distance from the historic downtown area, students can see the powerful Pawtucket Falls up close. Teachers and students can explore all of these resources more thoroughly by participating in education programs that feature hands-on activities and tours presented by the Tsongas Industrial History Center (TIHC), a partnership of Lowell National Historical Park and University of Massachusetts Lowell.

For example, in the Tsongas Center's curriculum-based education program *Power to Production*, students see some of the actual canals, buildings, and other features noted on the maps used in this lesson plan. Students visit the Suffolk Mill turbine exhibit, trace the manufacture of cotton cloth from power to production using mill cutaways and interactive power-train exhibits, and observe operating power looms in the Boott Cotton



Mills Museum. In the hands-on workshop, students test water wheels and build mill-and-canal systems.

Power to Production is a four-hour, fee-based program, one of many presented in Lowell National Historical Park by the Tsongas Industrial History Center. Reservations are required and can be made at 978-970-5000.

*From "History Lost and Found," *Journal of the National Trust for Historic Preservation*, Winter 2002.

Connections to the Massachusetts Curriculum Framework Standards:

History

HISTORY and SOCIAL SCIENCE

USI.28 Explain the emergence and impact of the textile industry in New England and industrial growth generally throughout antebellum America.

English Language Arts

ENGLISH/LANGUAGE ARTS:

2.4 Integrate relevant information gathered from group discussions and interviews for reports.

13.19 Identify and use knowledge of common graphic features (charts, maps, diagrams).

19.23 Write multi-paragraph compositions that have clear topic development, logical organization, effective use of detail, and variety in sentence structure.

For Special Needs or ELL students:

Project the maps in the front of the room, color key features, and make your list of observations and conclusions orally, as a group.

Lowell Mapping Activity

Directions for Students:

- 1) Look at Plate 1, “1821 EXPLANATION.” The symbols represent some features of the land and some of the ways in which people were using the land in 1821.
 - List the ways in which land was being used in 1821.
- 2) Look at Plate 2, “REFERENCE,” for additional information about land uses in 1821.
 - Generally speaking, how did the people in this area make their living in 1821?
 - Look at how land was used on each farm. Under the “Statute Measure” column, “A” stands for “Acres.” In the table below, list all of the ways in which land was used on each of the farms. In the “Acres” column, include the number of acres for each use, listing the uses that have the highest number of acres first, and the remaining uses in descending order. (“D^o.” means “ditto” or the same as the previous entry.)

Cheever’s Farm		Fletcher’s Farm		Tyler’s Farm	
Land Use	Acres	Land Use	Acres	Land Use	Acres

- What does this information tell you about pre-industrial, agrarian land use? What does it tell you about the specific kinds of work people did in this area at this time?

3) Look at Plate 3, the 1821 map.

- What is the name of the town on this map?
- Notice the land is divided into numbered sections. The sections marked by Arabic numerals belonged to the three largest farms in the area. Use Plate 2 (REFERENCE) to identify which sections belonged to each farm. Assign a color for each farm, and shade all the sections of each farm with that color. This will enable you to see clearly where each farm was and how big it was. Create your own key by filling in the table below.

Arabic Numerals	Name of Farm	Color

- Use the information on Plate 1 and the compass rose on Plate 3 to locate the areas of higher elevation. Look at the areas marked “Declivity of Hills.” (“Declivity” means “downward slope.”) Hilly areas are marked with the symbol shown. Where are the areas of higher elevation?

Circle your answer. North East South West

- Shade in brown the areas of higher elevation on the map.
- Find and shade in blue the waterways on this map. Compare the location of the Patucket Falls with the placement of the Pawtucket Canal. Why do you think this particular location was chosen for the canal?

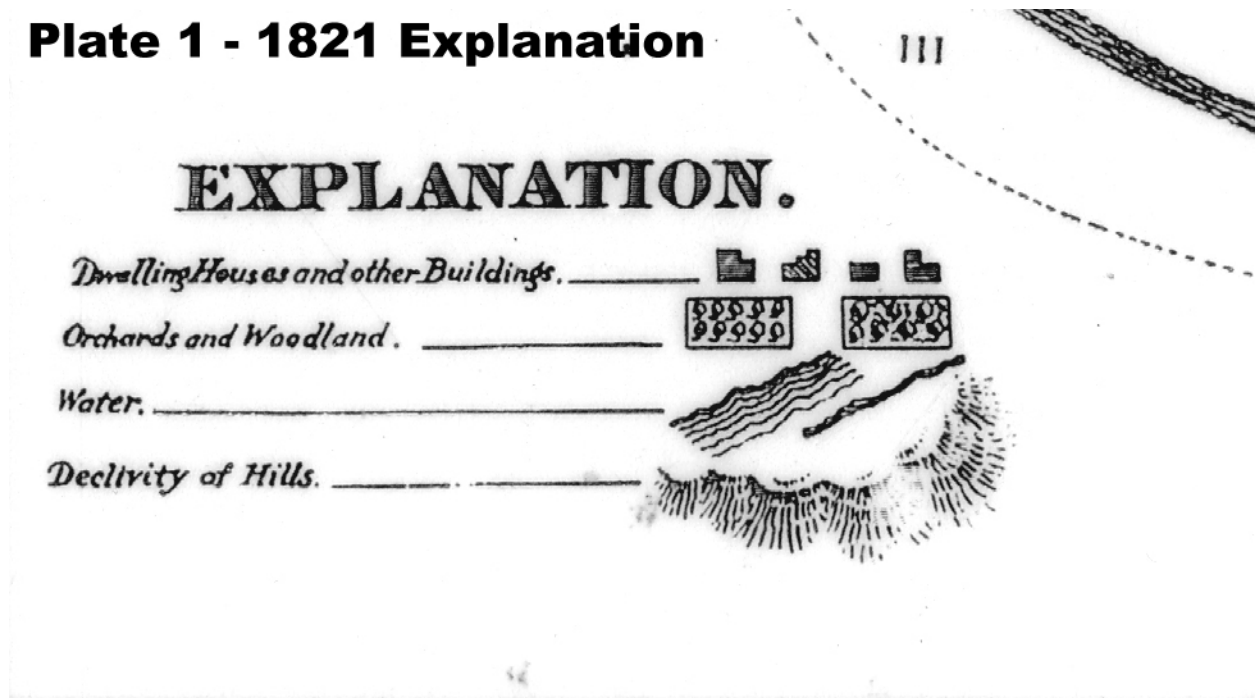
4) Look at Plate 4, “REFERENCE AND TRANSCRIPTION,” and examine the lists of buildings for the 1845 map. (“Do.” means “ditto” or the same as the previous entry.)

- List the two kinds of buildings identified on Plate 4, and write a description of each type.
- What does this evidence tell you about how Lowell changed from 1821 to 1845?

5) Compare Plate 5, the 1845 map, to Plate 1, the 1821 map.

- List the old main roads that still exist on the 1845 map. How do you think the old main roads influenced the development of the city?
- Shade in blue the waterways on the 1845 map. Compare the waterways on both maps. What waterway changes occurred between 1821 and 1845?
- Study the entire 1845 map, and list as many uses for the land as you can identify.
- Now focus on the areas that, in 1821, were the major farms: Cheever's, Fletcher's and Tyler's. How was that land was being used in 1845? What does this evidence tell you about how people made their living in 1845?
- Why do you suppose the textile mills were built in these particular locations and not elsewhere in the area shown on the 1821 map?

Plate 1 - 1821 Explanation



R E F E R E N C E

Numb	Premises.	Statute Measure			Numb	Premises.	Statute Measure			Numb	Premises.	Statute Measure		
		A	R	P			A	R	P			A	R	P
	CHEEVER'S FARM					BLETCHER'S FARM					TYLER'S FARM.			
1	House, Yard &c.	1	2		14	House, Yard &c.	3	8		25	House, Yard & Plat.	1	12	
2	Homestead	6		26	15	Orchard	1	16		26	Homestead	3	2	16
3	Meadow	10	3	5	16	D ^o	1	1	32	27	Front piece	8	1	21
4	Beach & Sand	2		22	17	Mowing Land	6		38	28	Tillage	5	3	8
5	Great Pasture	15		35	18	D ^o	9	1		29	D ^o	9	3	8
6	Eastern Lot	5		6	19	Tillage Land	11	3	32	30	D ^o	10	2	6
7	D ^o	7	3	50	20	Woodland	4	3	13			38	1	31
8	Mowing Land	5	1	26	21	Tillage Land	8			33	Five Acre Lot	5	2	34
9	Tillage Land	5	3	33	22	D ^o	9	3	17	36	Twelve Acre Lot	11	3	37
10	D ^o	10	3	2	23	D ^o	5	2	35			56		22
11	Woodland &c	16		9	24	D ^o	3	2	19					
12	Woodland, Arable &c	16	3	3			62		10	34	Canal Lot at Lower Land	2	1	25
13	South Lot	7		25	31		9	3	27	37	D ^o at the head of the Canal	6	1	5
		109	2	24	32	Ten Acre Lot		1	24					
					35	Lot South of Canal	2	1	10					
							74	2	31					

Plate 2 - 1821 Reference

Plate 2 - 1821 Reference

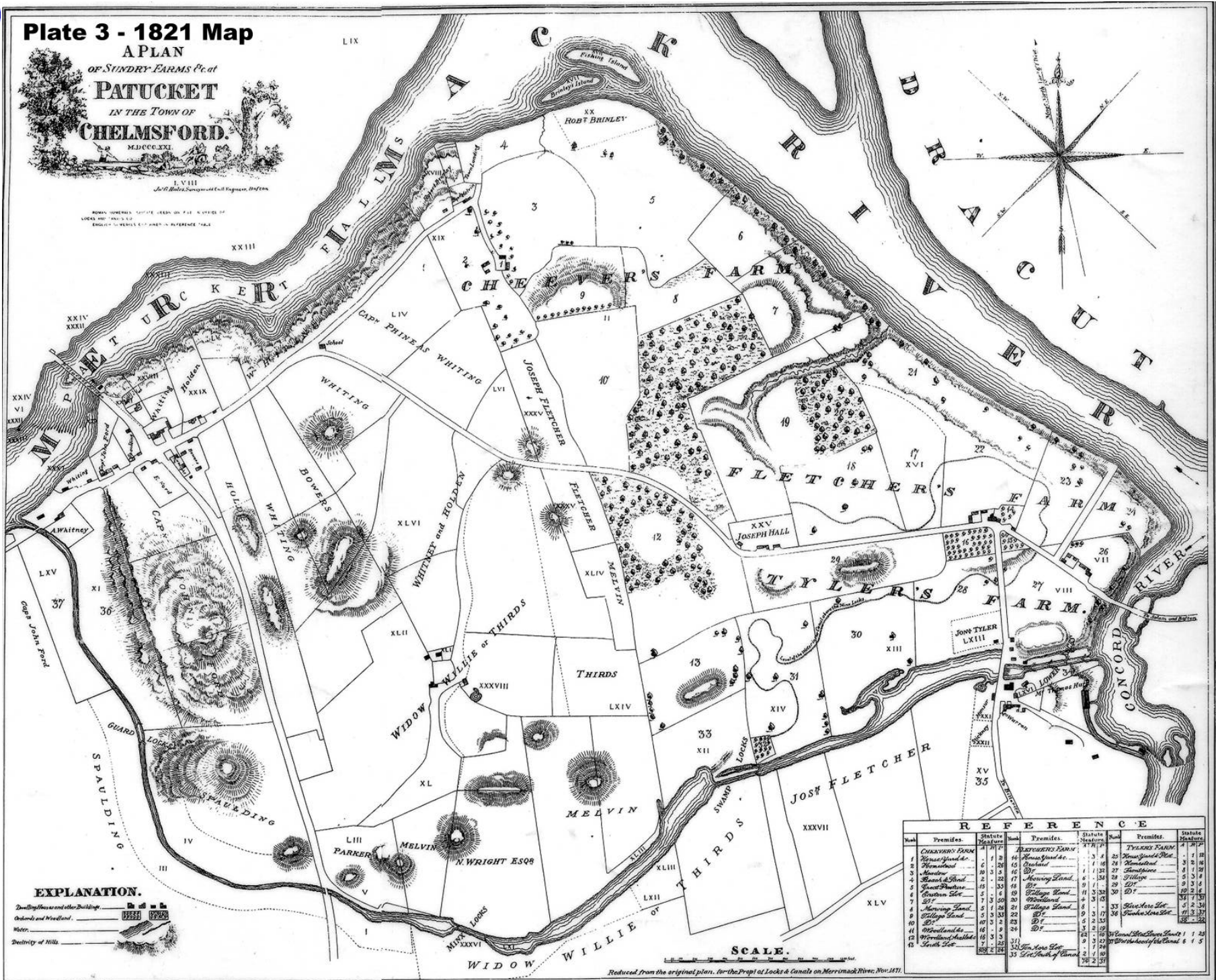


Plate 4 - 1845 Reference & Transcription**References.**

1. *St. Anne's First Episcopal Church*
2. *First Baptist*
3. *First Congregational*
4. *First Universalist*
5. *Old Methodist*
6. *First* ... do.
7. *Second Congregational*
8. *South* ... do.
9. *Worthen St. Baptist*
10. *First Catholic (St. Patrick's)*
11. *Second Methodist*
12. *First Freewill Baptist*
13. *Second Universalist*
14. *First Christian*
15. *John St. Congregational*
16. *Second Freewill Baptist*
17. *St. Luke's Second Episcopal*
18. *Second Catholic (St. Peter's)*
19. *Worthen St. Methodist*
20. *Third Universalist*

Public Buildings &c.

- A. *City Hall*
- B. *City Market & Court House*
- C. *Post Office*
- D. *High School*
- E. *Rail Road Office*
- F. *Whitney Mills*
- G. *Mechanics Mills*
- H. *Merrimack House*
- I. *American* ... do.
- J. *Stone* ... do.
- K. *Washington* ... do.

References

1. St. Anne's First Episcopal Church
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3. First Congregational
4. First Universalist
5. Old Methodist
6. First ... do.
7. Second Congregational
8. South ... do.
9. Worthen St. Baptist
10. First Catholic (St. Patrick's)
11. Second Methodist
12. First Freewill Baptist
13. Second Universalist
14. First Christian
15. John St. Congregational
16. Second Freewill Baptist
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18. Second Catholic (St. Peter's)
19. Worthen St. Methodist
20. Third Universalist

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- C. Post Office
- D. High School
- E. Rail Road Office
- F. Whitney Mills
- G. Mechanics Mills
- H. Merrimack House
- I. American ... do
- J. Stone ... do
- K. Washington ... do

